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MILITARY

NATION CONSIDERING MILITARY RECONNAISSANCE SATELLITE

OW100555 Tokyo KYODO in English 0506 GMT 10 Feb 82

[Text] Tokyo Feb 10 KYODO--Japan will have its own military reconnaissance satellite in orbit to spy on Soviet military activity in the Far East if the recommendations of a Liberal-Democratic Party committee are accepted. The LDP special committee on space development voted Wednesday to begin specific studies of the proposal, including the possibility of appropriating money for initial development in the fiscal 1983 budget.

Prime Minister Zenko Suzuki is said to be favorably inclined to the proposal, with sources close to the prime minister calling it "a good idea" so long as it does not provoke any "allergic reactions" among the public.

The committee will meet with Defense Agency officials Friday, and will send committee chairman Taro Nakayama to the United States later this month to discuss reconnaissance satellites with U.S. congressmen.

The ruling party's Security Affairs Research Council has also begun a study of the proposal.

The proposal calls for a camera-equipped reconnaissance satellite that would provide immediate information on Soviet military movements in the Far East. At present Japan relies on information passed on from U.S. satellites, and is often uninformed about Russian activities in the region.

Nakayama maintains the satellite would contribute to preventing war, and thus would not be out of keeping with Japan's "exclusively defensive defense" policy.

The Space Development Committee will continue its study of whether the satellite should be produced domestically, and launched by a Japanese rocket, he said. Japan has a successful track record with weather satellites, and the project is considered technically feasible.

But cost is another question. While weather satellites are boosted into high orbits where they can remain in place for years, military reconnaissance satellites are placed in low orbits to improve the resolution of the pictures they take. Such low orbits, skimming the top layers of the atmosphere, decay rapidly.

The lifetime of a military reconnaissance satellite can range from as long as a year to as short as 10 days. They must be launched repeatedly in order to maintain coverage of "enemy" movements. The committee has estimated the cost of a single satellite launch at yen 20 billion (dollar 85 million). "We can do it for the cost of two F-15S," Nakayama said.

Another problem is how to recover pictures taken by the satellite. The two methods employed by the United States and the Soviet Union are a recoverable capsule ejected by the satellite and returned to earth by parachute, and ground reception of electronic pulses beamed from the satellite. Japan lags far behind the United States in both technologies.

CSO: 4120/168

SCIENCE AND TECHNOLOGY

MILITARY SATELLITE BEING CONSIDERED

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CSO: 4120/150

SCIENCE AND TECHNOLOGY

PROBLEMS CONCERNING ADVANCED THERMAL REACTOR DISCUSSED

Tokyo ENERUGI FORAMU in Japanese Dec 81 pp 28-33

[Roundtable discussion by journal editor in chief, an economic reporter, and a commentator]

[Text] Roundtable participants: A = editor in chief;
B = economic reporter; C = commentator.

The ATR (advanced thermal reactor) experimental reactor issue embodies the typical question of what the policy awareness and policy decision should be at the stage of progressing from independent technological development of nuclear energy to its application and industrialization. That is to say, it is related to the concrete development of Japan's strategic concept on nuclear energy. Here, we shall examine some of the conditions surrounding and the activities concerning the policy decision on the ATR experimental reactor issue, clarify them and offer some solutions.

Activities in Various Circles on the ATR Issue

Journal: Some 4 months have gone by since the Atomic Energy Commission's ATR expert evaluation group (Tomioichiro Shirosawa, chairman) reported its findings to the AEC on the ATR experimental reactor, a national project, on 4 August. And during that period, the post of acting chairman of the AEC was turned over to Mr Takashi Mukaibo. Let us take a look at events that have transpired since that time.

Final Decision Expected Next March

A: Judging by the outward activities of the AEC and its secretariat, the Science and Technology Agency's Atomic Energy Bureau, the initial thinking called for a decision by the end of this year, but now it is expected to be around the end of March next year. Since the AEC is now at work revising the long-range plan (regarding research and development and atomic energy application), and other groups are reviewing policies for the first 10-year period of the 20-year projection, the decision is expected to come around the time this work is completed.

Looking back in detail, just before the Shirogawa expert group was to make its recommendations, the Ministry of International Trade and Industry protested, as being illogical, the AEC's direct communication with the electric power industry, bypassing MITI. When I happened to be chatting with Mr Hiromi Arisawa (President, Japan Atomic Industrial Forum, Inc) about that time he revealed his displeasure, saying: "The AEC can make plans and policy decisions on its own. So why is the secretariat, the Science and Technology Agency, so bewildered?"

Another fact involves an informal, unofficial gathering of government officials from both sides of the road at the Kasumigaseki intersection. Those on one side of the road suggested: "If the Electric Power Development Company continues to advocate Candu, it is even possible, when considering business conditions from among some 100-odd special juridical bodies for it to be transferred to private enterprise, as endorsed by Doko. But if the Electric Power Development Company were to effect a technology transfer of ATR, representing the state's achievements, to the private sector, then a change to civilian operation could be averted."

But when the other side came around to agreeing, the first side interjected: "But it would be bad if Candu were made a condition." This is because of complex problems that could arise through entanglement with the "provision of understanding" of the Japan-Canada Atomic Energy Pact.

Then, there appears to be secret talks on the proposal from the other side for conducting only research for 2 years with no assumption of introduction.

C: I, too, believe that this is a matter for the AEC to decide. Although the AEC said it would study the report carefully and act on it, August was a month of summer recess and little was done in September. An economic study of the use of plutonium in the light water reactor and the ATR is now in the final stages. Consequently, the decision on the ATR problem is being reached much more slowly than expected.

As for the AEC's coming moves, now that various discussion meetings have ended, it is expected to hold talks with, perhaps, the electric power industry, manufacturers, financial circles and MITI, before rendering a final decision.

A: Lately, events that highlight the position of the AEC are taking place. For instance, an AEC member's term expires this Christmas Eve, but it appears that an informal decision has been made to reappoint him in view of the pending ATR and the uranium enrichment pilot plant issues. By the time this journal is out, the matter of his approval for another term will have come before the Diet.

Journal: What are some activities of the electric power companies and their stance?

B: As for the Kyushu Electric Power Company, it is studying the matter cautiously; besides, the AEC itself is behind in its coordinating tasks. The power company's stance is that this matter is not its direct concern, that it is a secondary issue. Although the length of time and the depth of study may have no bearing, it considers that a delay in the decision will enable more time for study.

Going further, it can be said that it would be pleased to see the study go on indefinitely (laughter).

I think the ATR expert group of the Federation of Electric Power Companies which has been making the practical evaluation study has, in fact, already reached a conclusion. But there being absolutely no connection between a presidential high-level policy decision and a practical level conclusion, the electric power industry is now faced with the need to look around and determine how to reach a political decision. But it is a situation where there is nothing to be gained even if it makes its own political decision.

The Electric Power Development Company, a leading choice for construction of the ATR, is in a very difficult position and should guard against speaking loosely. There is no need to speak out distinctly at formal functions or to us outsiders. That should be left up to the AEC or the government. Formal requests for statements can be considered as required.

Factors in Making Policy Decision

Plutonium Utilization Plan Needed

Journal: As regards Mukaibo's AEC, it is supposed to render a final decision based on its own policy judgment upon consideration of domestic and external conditions, but...

A: It can be said to be ready and willing.

C: Looking at it from a mischievous aspect, the ATR experimental reactor costs 300 billion yen, but the atomic energy project is replete with the original uranium enrichment plan and the FBR's "monju." How the commission will view the ATR experimental reactor in the light of such a situation will have a large impact.

In view of such a large number of projects, the commission could have enough material to recommend a 2- or 3-year delay for financial reasons. This is a very mischievous view, but that kind of policy decision is possible.

B: That is highly possible.

A: As regards peripheral situations likely to have a grave effect on the AEC policy decision, AEC acting Chairman Mukaibo flew to Washington on 17 September, 1 week after the Nakagawa-Mansfield Japan-U.S. meeting on reprocessing, to attend the meeting of the Committee on Japan-U.S. Cooperation in Science and Technology, in which Mukaibo had participated since his days as president of Tokyo University. After it was over, he held talks with key U.S. atomic energy officials for 4 days. During a conversation with Mr Mukaibo upon his return, I learned of some important developments.

One was that, in view of the movement toward global nuclear nonproliferation, U.S. restrictions against Japan could tighten considerably unless a scenario for final utilization of plutonium is concretely drafted, should there be no great change in

the Nuclear Nonproliferation Law of 1978, on which the U.S. nuclear nonproliferation spirit is based. Because of this, the need for a concrete plutonium utilization plan was cited.

Apart from the question of a government or private nature, it is important for Japan's atomic energy circles to focus on global movements. An electric power company is a private enterprise, but its business will ultimately be affected.

The second point concerns the electric power companies' contract with the nuclear fuel company (COGEMA) of France for overseas reprocessing of spent fuel. Although the Mitterrand government has promised to honor the existing contract on reprocessing, it has asked for a final utilization plan on recovered plutonium. As the country undertaking the reprocessing task, this action is natural since the recovered plutonium results in excess plutonium and enhances the risk of nuclear proliferation if no specific use is contemplated.

Faced with a dilemma, one electric power company appealed to the Power Reactor and Nuclear Fuel Development Corporation for a certificate of use, claiming that the recovered plutonium was for use in projects for development of the Fugen reactor or fast breeder reactor. The Kyushu Electric Power Company is faced with the same problem.

As is evident from all this, the electric power companies should not dismiss the statements made by Mr Mukaibo upon his return, such as that concerning external conditions pertaining to the nuclear nonproliferation issue under the Mitterrand government of France, as government moves. Unless top management officials give serious thought to the problem of reprocessing and recovery of spent fuel from the light water reactor, light water reactor generation itself will be impaired.

It also means trouble for secondary reprocessing by the Nuclear Fuel Service. The riddle of the ATR issue can never be solved unless it is viewed as a matter of worldwide nuclear nonproliferation movement and the completion of a nuclear fuel cycle, and not limited to just one reactor.

B: I agree with you on policy, but whether electric power entrepreneurs having supply responsibility should undertake it is another matter. An overassessment of an unrealized ATR is unwise. Under the present circumstances, including financial reasons, priority should be given to expediting the development of the FBR, the main cycle in plutonium utilization.

Regarding the lack of a plutonium utilization plan, it certainly can be said that the electric power entrepreneurs failed to understand the problem and keep up with operations. But this is also due to the delay experienced in FBR development itself under government direction.

Nuclear Nonproliferation Character of ATR

C: The electric power companies were in opposition from the day the ATR was first conceived as a project. In essence, they considered that the FBR would suffice. Convinced of the need, after giving thought to future energy problems, to strategically develop a nuclear fuel cycle linking the light water reactor, the ATR and the

FBR, Mr Arisawa came up with the two lines, ATR and FBR, and formed the Power Reactor and Nuclear Fuel Development Corporation. This was followed by construction of a reprocessing plant. Thus, Japan's atomic energy development advanced, with securement of the nuclear fuel cycle as the basic line.

But with the announcement of Carter's nonproliferation policy, 2-month discussions took place in INFCE [International Fuel Cycle Evaluation].

Although Japan had undertaken ATR development for purposes of the nuclear fuel cycle, it became necessary, for an international point of view regarding nuclear nonproliferation policy, to burn plutonium. A research report prepared for the U.S. Department of Energy, entitled "Fugen, the Mirror of Japan's Atomic Energy Policy; Its Significance to the United States and INFCE," states in part: "Japan believes that the safest place for plutonium fuel is inside the atomic reactor, where it contributes to energy generation." In short, it says that the safest place for storing plutonium is inside atomic energy, namely, "Fugen."

It may be said that the existence of the ATR has further international significance in that in addition to securing the nuclear fuel cycle, it provides a safe storage site for plutonium, unthought of before. In that sense, the time has come to take a serious look at the ATR's significance.

The development of the FBR should be expedited, it is true, but when one asks about its progress, the truth is that the completion date of "Monju" is unknown. Furthermore, with the FBR, the reprocessing of spent fuel must be carried out simultaneously; if not, the development of the FBR holds no meaning. But with the recent construction of the CPF (high-level radioactive material research facility), basic research finally should begin soon.

When Mr Oyama was still with the Power Reactor and Nuclear Fuel Development Corporation, I asked him when the FBR would be ready for utilization. He asked me what I meant by ready for utilization. I said I figured some four or five units the size of experimental reactors, adding that perhaps this was not possible in this century. Bending his head, he stated he would like to see it realized, but.... Perhaps, no one is bold enough to say that utilization of the FBR will occur in this century.

In such circumstances, what is to be done with the plutonium pileup as the light water reactor becomes widely used. ATRC (advanced thermal converter reactor) which will use plutonium derived from light water reactor has been suggested, but the electric power side is unwilling, even though fuel is available. Fear rules out its use.

It is clear that the ATR group report leaves many questions unanswered. Because of many future unknown factors, it could be that some areas will remain inconclusive. This highly complicates the problem of the ATR experimental reactor, but it can be worked out somehow, depending on conditions.

A: With respect to when the FBR will reach a state of utilization, the projection, based on INFCE international conferences, is 2010 or even 2015. It must be realized that the development of the FBR is not as simple as was initially believed.

During an informal conversation at the INFCE meeting, a delegate from West Germany said to a Japanese delegate: "Japan is fortunate in having the ATR which can burn plutonium," and after broaching the subject, revealed that "we are now thinking of something comparable." It probably was in reference to a plan to burn plutonium with West Germany's KWU pressurized water reactor.

Another story is that the Tokyo Electric Power Company recently coaxed the manufacturers into concluding a contract for a feasibility study between KWU and Hitachi, Toshiba and Fuji Electric. The manufacturers and Tokyo Electric have denied this, but some experts suspect that thought is being given to burning plutonium with a KWU pressurized water reactor.

Unsubstantial Policy Matter Taking Precedence

B: Even if a single ATR experimental reactor were made, how about the essential heavy water supply? This is also related to the energy security problem. With the ATR, nothing much has been said on this point, and it appears that unsubstantial policy arguments are taking precedence. As an actual problem, even if a decision were reached to produce the ATR, only one 600,000 unit would be possible at the outset, not 10 or 20. The energy security issue can perhaps be cited in justification, but, for example, when the scale of atomic energy development should have been about 50 million kW by 1990, it may only amount to 600,000 kW. At that rate, how meaningful would it be? I am extremely dubious.

A: We have just discussed the Mitterrand government's nuclear nonproliferation policy as revealed by Mr Mukaibo on his return. If this holds true in the future, at least the three major electric power companies should have the determination to battle the nuclear nonproliferation policies of the United States and France through the introduction of the ATR for light water reactor spent fuel; otherwise, even a light water reactor can't be built. The plutonium and uranium residues of spent fuel from two light water reactors will supply enough fuel for one ATR.

Another point is the comparison of the light water reactor and the ATR by the Shirokawa expert group, with 1982 as the start-up date.

This poses a problem. With respect to U.S. light water reactors, there is ongoing research for improvement of eight experimental reactors, ranging from Indian Point No 1 to the Oyster Creek reactor, a commercial version contracted for in 1964. Against this, the ATR is the second one at the Fugen power plant, and it is being debated on the same basis as the light water reactor. In addition, turning things around, only the high cost aspect is emphasized, saying that ATR experimental reactor No 1 costs 80 percent more, or 30 percent more for 10 units. This is improper.

AEC Policy Decision Questioned

AEC at Turning Point

Journal: From what has been said, what do you wish to see accomplished in the AEC's policy decision on the ATR experimental reactor issue?

C: The ATR, first of all, is what the AEC decided and worked on as a national project. The upshot is that today, after having looked at the operation of "Fugen" and its results, the expert group in its report gave the green light for the reactor. This means that the ATR embodies the results of the input of national funds amounting to 1.7 trillion yen for atomic energy. To scuttle it is out of the question. Each and every member of the AEC would have to shave his head or commit hara-kiri. Apart from the time element, there is a tendency to want to see it attain adulthood after having been reared through domestic technology. That care is necessary.

In such a case, the private sector must become the prime mover, as noted in the expert group's report. The AEC, hitherto preoccupied with research and development policies, would then have to develop new policies on the transfer of technology regarding achievements in development to the private sector. It would have to change its old ways of thinking and not be confined within the Science and Technology Agency. In that sense, the current AEC faces a great change.

Furthermore, in making a policy decision, the AEC should listen carefully to the views of electric power companies and financial circles, manufacturers and others concerned. It should then render a decision befitting a supreme decisionmaking organ.

Then, construction matters will be decided. As cited in the report, since the cost of generation would be greater than in the case of the light water reactor, it would be only natural for the side undertaking the task to give first consideration to economy. The question of the extent of national aid surfaces. One story is that with full government financing, the cost of generation will run about 19 to 20 yen, [as published], against 17 to 18 yen for oil and thermal generated power. Such being the case, there would be a need for equity funds from private electric power companies.

Also, for example, since the cost at the nuclear power plant at Tokai was extremely high, the electric power companies helped out by purchasing at a high price. With the ATR, rather than the economic consideration of paying more because of high reactor generating costs, the policy will probably have much to do with setting the price.

A: I fully agree. Definitely, the AEC and the secretariat should move a short distance from the present building into the Prime Minister's Office building.

Glancing at the history of Japan's atomic energy development, the more the generating capacity of the light water reactor has grown, the more intense has been MITI's policy to castrate the AEC.

In short, MITI officials dislike the thought of going over to the Science and Technology Agency to bow their heads. I therefore wish for a structure whereby it can move to the Prime Minister's Office building without hurting MITI's pride so that it can render a decision by itself.

From another aspect, it seems that the electric power companies, and the pilot plant for uranium enrichment as well, are adept at avoiding entanglement in the

constant wrangling between government officials facing each other across the street at Kasumigaseki.

Thus, by moving into the Prime Minister's Office building and holding deliberations there and assuming the position that the AEC is the supreme policymaking organ for plans, suggestions and decisions, as Mr Arisawa contends, the ensnarled ATR problem can somehow be settled.

Expand Ideas of Private Nature

B: Radically speaking, while only the decision to proceed with the ATR seems to remain before us, we are at a time when private industry should be the main force for the nuclear fuel cycle project so far managed by the government, including uranium enrichment, reprocessing and the ATR. In this sense, the old idea of the government and the AEC making a decision for others to implement will not work. The policy decision of the government should take into account the ideas of the private sector, or constructive thinking.

Moreover, the people involved in policy decisions are those with careers dating to the very early days of atomic energy and they harbor old ideas. We should begin to make changes from there. If we take a fresh look at Japan's position, we see that the argument for continuation simply because something is a national project is antiquated. Those making policy should have the courage to put a stop to this as required.

A: I favor utilizing private efforts, but one must not forget that, basically, in atomic energy, the state is involved in many areas, whether it likes it or not.

Furthermore, the electric power companies still think of nuclear energy generation as an extension of conventional thermal generation. This is frightening. Atomic power generation is a revolutionary industry, always accompanied by radiation and radioactivity.

In this sense, while the use of private efforts of electric power companies is important, I would like to have the people there realize that the nation inherently plays a major role in atomic power generation.

C: Although I favor private efforts, I'd like to see the electric power industry go more after newer things.

A look at the history of the electric power companies shows that they have been making purchases of only those that were proven to be absolutely safe.

The electric power companies are different from, for instance, Toshiba or Hitachi. They are all private enterprises and in an enviable position. Even Hitachi is spending 100 billion yen for research and development. The electric power companies should put greater effort into challenging new technological developments.

Journal: We shall end this discussion for now.

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SCIENCE AND TECHNOLOGY

GOVERNMENT OKAYS FISCAL 1982 BUDGET

Tokyo JAPAN PETROLEUM & ENERGY WEEKLY in English Vol 17 Nos 1&2, 4 & 11 Jan 82
pp 1-5

[Text]

Energy projects, along with defense and overseas economic aid, have been given a "sanctuary" status — exceptional priority — in the final government budget for fiscal 1982 beginning in April of this year, while most other spending programs are limited to fiscal 1981 levels.

The fiscal 1982 budget, approved at an extraordinary cabinet meeting held on December 28, 1981, and subject to debate and approval by the 96th session of the Diet in late January after the New Year holidays, calls for spending totaling ¥49,681 billion (\$226 billion) under the general account and ¥20,289 billion (\$92 billion) under the fiscal loans and investment program. Compared with the original budget for the current fiscal year, these represent increases of 6.2 and 4.1 percent, respectively, the smallest gain in 25 years. Meanwhile, the government economic outlook envisages a 5.2 percent growth of the gross national product in real terms. (See "Japan's Official Economic Outlook for Fiscal 1982" shown on the next page.)

The Japanese government's spending on energy projects in fiscal 1982 will be carried out on a three-tier basis, with the special accounts constituting a main pillar, as outlined below:

General Account

The general account covers all necessary expenditures for the nation's general administration. Funds for the general account come from income taxes, stamps, flotation of government bonds and the "petroleum tax."

A total of ¥563,195 million (\$2,560 million) will be appropriated, including Japan's contribution to the Paris-based International Energy Agency. This is a 13.2 percent increase over the fiscal 1981 budget. Of the foregoing amount, ¥385,000 million (\$1,750 million) will be transferred to the special account as described below. This transfer from the general account to the special account represents a 21.1 percent increase over fiscal 1981.

Fiscal Loans & Investment Program

Spending in the fiscal loans and investment program (frequently called the

Japan's Official Economic Outlook For Fiscal 1982

<u>GNP</u>	<u>Fiscal 1982</u> <u>(Forecast)</u> <u>¥ tril. \$ bil.</u>	<u>Fiscal 1981</u> <u>(Estimated)</u> <u>¥ tril. \$ bil.</u>	<u>Fiscal 1980</u> <u>(Actual)</u> <u>¥ tril. \$ bil.</u>	<u>% Change</u> <u>82/81</u> <u>81/80</u>
Gross National Product, in nominal terms	277.2	255.8	239.2	8.4 7.0
Gross National Product, in real terms	-	-	-	5.2 <u>4.1</u>
Personal consumption expenditures	160.3	147.6	138.8	8.6 6.4
Private housing investment	17.7	15.5	15.1	14.3 2.4
Private business capital investment	43.5	39.4	37.6	10.5 4.9
<u>Labor Force</u>				
Labor force, million	57.7	57.15	56.71	1.0 0.8
Employed labor force, million	56.5	55.9	55.52	1.1 0.7
<u>Industrial Production</u>				
Mining & manufacturing index	-	-	-	5.5 4.3
<u>Commodity Prices</u>				
Wholesale price index	-	-	-	3.0 <u>1.8</u>
Consumer price index	-	-	-	4.7 <u>4.5</u>
<u>International Payment Balance</u>				
Current account balance	2.6 <u>12.0</u>	2.3 <u>10.0</u>	(1.6) (7.0)	
Foreign trade balance:				
Export receipts	6.6 <u>30.0</u>	5.9 <u>26.0</u>	1.4 <u>6.8</u>	
Import payments	36.2	34.3	29.2	5.8 17.2
	29.7	28.4	27.9	4.4 2.0

second budget) is funneled through public enterprises and corporations (such as the Japan National Oil Corp.) and government banks (such as the Japan Development Bank and the Export-Import Bank of Japan). Money raised by postal savings is the major source of funds for this program.

The fiscal loans and investment program for energy-related projects in fiscal 1982 will be as follows:

- Loans from the Japan Development Bank to resource and energy projects will total ¥455,000 million (\$2,068 million), an increase of 11.8 percent over fiscal 1981, while loans for the marine transportation industry to construct primarily coal and LNG/LPG carriers will be ¥134,500 million (\$611 million). (During fiscal 1982, construction of 600,000 G/T will be carried over from the 37th Shipbuilding Program and that of 1.3 million G/T will be started under the 38th Program.)
- Export-Import Bank loans to facilitate foreign-currency-denominated loans to promote emergency imports of commodities such as crude oil (for expansion of government-owned oil stockpiles) will be ¥91.6 billion (\$400 million), and those for industrial plant exports will total ¥590 billion (\$2.7 billion) including buyer's credit/bank loans, a 7.2 percent increase.
- The Overseas Economic Cooperation Fund's investment in the form of the Official Development Assistance will total ¥535 billion (\$2.4 billion), an 11.5 percent increase.
- The budget for Japan National Oil Corp. (JNOC) will total ¥937,898 million (\$4,263 million), a 43.2 percent increase over fiscal 1981. Of this total ¥620,800 million will be financed under the fiscal loans and investment program.

Special Accounts

Energy-related special accounts rely for funds on revenues from crude/fuel oil import duties and electric power resources-development promotion taxes. Revenues from the "petroleum tax" (see note on page 4) are pooled into the general account, part of which is then transferred to the special accounts.

A total amount of ¥727,800 million (\$3,308 million) will be appropriated to two major special accounts, which are sub-divided into five accounts. This is an 8.3 percent increase over fiscal 1981.

(Unit: ¥ million)

	<u>Fiscal 1982</u>	<u>Fiscal 1981</u>	<u>% Change</u>
A. Coal & Petroleum/Non-Petroleum, Alternative Energy Special Account			
a. Coal Account	136,250	138,745	- 1.8

	<u>Fiscal 1982</u>	<u>Fiscal 1981</u>	<u>% Change</u>
b. Petroleum/Non-Petroleum, Alternative Energy Account			
i) Petroleum	353,524	305,600	+15.7
ii) Non-Petroleum, Alternative Energy	<u>53,776</u>	<u>55,701</u>	- 3.5
	407,300	361,301	+12.7
Total (a + b)	543,550	500,046	+ 8.7
B. Electric Power Resources Development Promotion Special Account			
a. Electric Power Resources Diversification Account	112,294	102,410	+ 9.7
b. Electric Power Plant Siting Account	<u>71,932</u>	<u>69,463</u>	+ 3.6
	184,226	171,873	+ 7.2
Total (A + B)	727,776	671,919	+ 8.3

Projects covered under accounts A-b-ii and B-a above are combined to promote measures for non-petroleum, alternative energy development.

Funding sources and distribution thereof are as shown below: (Unit: ¥ million)

<u>Source of Funds</u>		<u>Distribution*</u>	
. Crude/fuel oil import duties	145,000	134,700	— Coal account
Crude oil ¥540/kl (46¢/bbl)		10,300	— Petroleum/non-petroleum, alternative energy account
Fuel oil A ¥955/kl (69¢/bbl)			
Fuel oil B ¥730/kl (53¢/bbl)			
Fuel oil C ¥660/kl (48¢/bbl)			
. Petroleum tax* (as transferred from general account)	385,000		
. Electric power resources-development promotion tax @¥0.3/kwh	143,500	102,800	— Elect. power resources diversification account
		40,700	— Electric power plant siting account

(*) Balances between figures shown below and those shown above represent "surpluses" carried over from fiscal 1981.

(+) The "petroleum tax" was instituted effective June 1, 1978, to secure a new source of treasury revenue to cope with the then-worsening shortfall of national revenues resulting from the protracted business recession. The tax rate is 3.5 percent on an advalorem basis of the c.i.f. cost plus import duty of the imported crude, or of the wellhead price of the locally produced crude oil. For product imports, "adjustment factors" ranging from 40 to 80 percent are used to reduce the amount calculated from the foregoing formula.

Among the highlight projects to be covered by the energy budget for fiscal 1982 are:

- The "Sunshine Project" -- launched in July 1974 to harness, by 2000, inexhaustible and clean energy sources such as solar, geothermal and hydrogen, and to undertake R&D on coal liquefaction/gasification for commercial use -- calls for spending of ¥41,636 million (\$189.3 million), a 23.7 percent increase over fiscal 1981.
- The "Moonlight Project" -- launched in 1978 as a counterpart of the Sunshine Project to promote R&D on energy conservation -- calls for expenditures of ¥9,490 million (\$43.1 million), a 3.6 percent increase.
- JNOC's financial assistance to private oil and gas exploration projects calls for spending of ¥140 billion (\$636 million), a 20.7 percent increase.
- The Japan Cooperation Center for Petroleum Industry Development (JCCP), established on November 10, 1981, by 44 private firms including 31 oil firms with the aim of strengthening friendly and cooperative relations between Japan and oil-producing nations, will receive ¥1,045 million (\$4.8 million).
- The governmental geophysical reconnaissance survey, including stratigraphic drilling of two offshore wells and one onshore well, calls for ¥8,890 million (\$40 million).
- R&D on subsea oil production systems is allotted ¥3,990 million (\$18 million).
- R&D on C1 chemistry calls for spending of ¥2,527 million (\$11 million).
- Expansion of oil/LPG stockpiles:
 - . Government-owned stockpiles (additional 1.5 million kl to 12.54 million kl -- i.e. 19 days' supply) ¥265,100 million (\$1,205 million)
 - . Financial aid to privately owned stockpiles ¥208,100 million (\$946 million)
- R&D on residual oil cracking ¥8,357 million (\$38 million)
- Coal resources development ¥8,556 million (\$39 million)
- Promotion of solar system development ¥6,058 million (\$27.5 million)
- Construction of a 50 t/day pilot plant for brown coal liquefaction in Australia ¥16,136 million (\$73.3 million)
- Geothermal energy development ¥9,267 million (\$42.1 million)
- Financial aid to coal-burning thermal power plants ¥6,086 million (\$27.7 million)
- R&D on nuclear energy utilization (including uranium enrichment, spent nuclear fuel reprocessing) ¥11,052 million (\$50.2 million)
- Grant-in-aid to promote electric power plant construction projects ¥51,369 million (\$233 million)

SCIENCE AND TECHNOLOGY

FISCAL 1982 BUDGET FOR ENERGY-RELATED PROJECT DISCUSSED

Tokyo JAPAN PETROLEUM & ENERGY WEEKLY in English Vol 17 No 6, 8 Feb 82 pp 1-10

[Text] Starting with this issue, we will carry a series of articles reporting on the fiscal 1982 budget relating to petroleum and energy projects, expanding in greater detail what was previously reported in our January 4/11 issue. The first installment deals with the budget for the Petroleum Special Account to cover i) oil & gas resources exploration and development, ii) oil/LPG stockpiling, and iii) R&D on residual oil processing, petroleum alternatives (see page 7 for definition of the term "petroleum alternatives"). Subsequent installments will report on the Non-Petroleum, Alternative Energy Special Account, Electric Power Resources Development Promotion Special Account, etc.--Editor.

1. Oil & Gas Resources Exploration and Development Projects

The so-called Japanese-developed crude oil now totals approximately 500 thousand barrels per day, which account for nearly 10 percent of Japan's total oil supply. The long-range objective calls for increasing the proportion of Japanese-developed crude to more than 20 percent by 1980, thus requiring an expansion of governmental financial aid to private oil exploration and development projects through the Japan National Oil Corp. (JNOC).

In an attempt to help minimize financial risks involved in private oil and gas exploration projects, JNOC provides 80 percent of total funds required for exploration on the Japanese continental shelf in the form of equity capital or loans, while providing 70-80 percent of total funds required for overseas projects.

Among major projects which have been under way for several years and are expected to continue to receive financial aid from JNOC in fiscal 1982 are:

- Japan Oil Development Co.'s project off Abu Dhabi
- United Petroleum Development Co.'s project off Abu Dhabi/Qatar
- Sakhalin Oil Development Cooperation Co.'s project off Sakhalin
- Indonesia Nippon Oil Cooperation Co.'s project in Indonesia
- Japan China Oil Development Corp.'s project in the Bohai Gulf
- Arctic Petroleum Corp.'s project in the Beaufort Sea, Canada

In addition to the foregoing financial aid to exploration projects, JNOC also guarantees the liabilities related to loans from Export-Import Bank of Japan and city banks received by companies engaged in development projects in overseas projects. For this purpose, JNOC deposits its money into a fund established to that end, and JNOC is empowered to guarantee the liabilities within a framework corresponding to 20 times the total amount of the fund.

By the end of fiscal 1981 (i.e., March 31, 1982), JNOC's cumulative financial aid to exploration projects will have reached ¥616,600 million (\$2,680 million), while the JNOC's fund for guaranteeing development-related liabilities will have totaled ¥16,500 million, increasing JNOC's framework for guaranteeing liabilities to ¥330,000 million. Since its establishment in 1967, JNOC has played a vital role in promoting Japan's oil and gas exploration and development activities. Shown below are year-to-year movements of JNOC's financial aid to exploration/development projects:

Fiscal year	JNOC's Financial Aid to Exploration Projects			JNOC's Guarantee of Development-Related Liabilities			
	As equity capital	As loans	Total	Deposit into fund	Amount of liabilities guaranteed	Amount of liabilities de-guaranteed	Balance of liabilities guaranteed
1967-1970 Cumulative	18.6	4.7	23.3	1.4	11.2	0.5	10.7
1971	13.0	0.5	13.5	1.2	10.5	4.1	17.1
1972	19.1	3.9	23.0	3.5	25.3	3.1	39.3
1973	20.3	7.7	28.0	0.5	17.6	7.9	49.0
1974	28.0	44.8	72.8	1.5	41.5	15.0	75.5
1975	30.6	50.9	81.5	1.0	69.0	3.3	141.2
1976	22.6	31.1	53.7	2.9	89.5	7.3	223.4
1977	13.2	21.4	34.6	1.7	36.3	26.2	233.5
1978	15.5	19.5	35.0	0.0	8.8	15.3	227.0
1979	18.0	35.2	53.2	0.8	7.9	23.0	211.9
1980	33.1	48.9	82.0	1.0	10.4	26.5	195.8
Cumulative	232.0	268.6	500.6	15.5	328.0	132.2	195.8

Japan's indigenous oil & gas production and the Japanese-developed crude oil imported from abroad during the last decade were as shown below:

Indigenous Oil & Gas Production

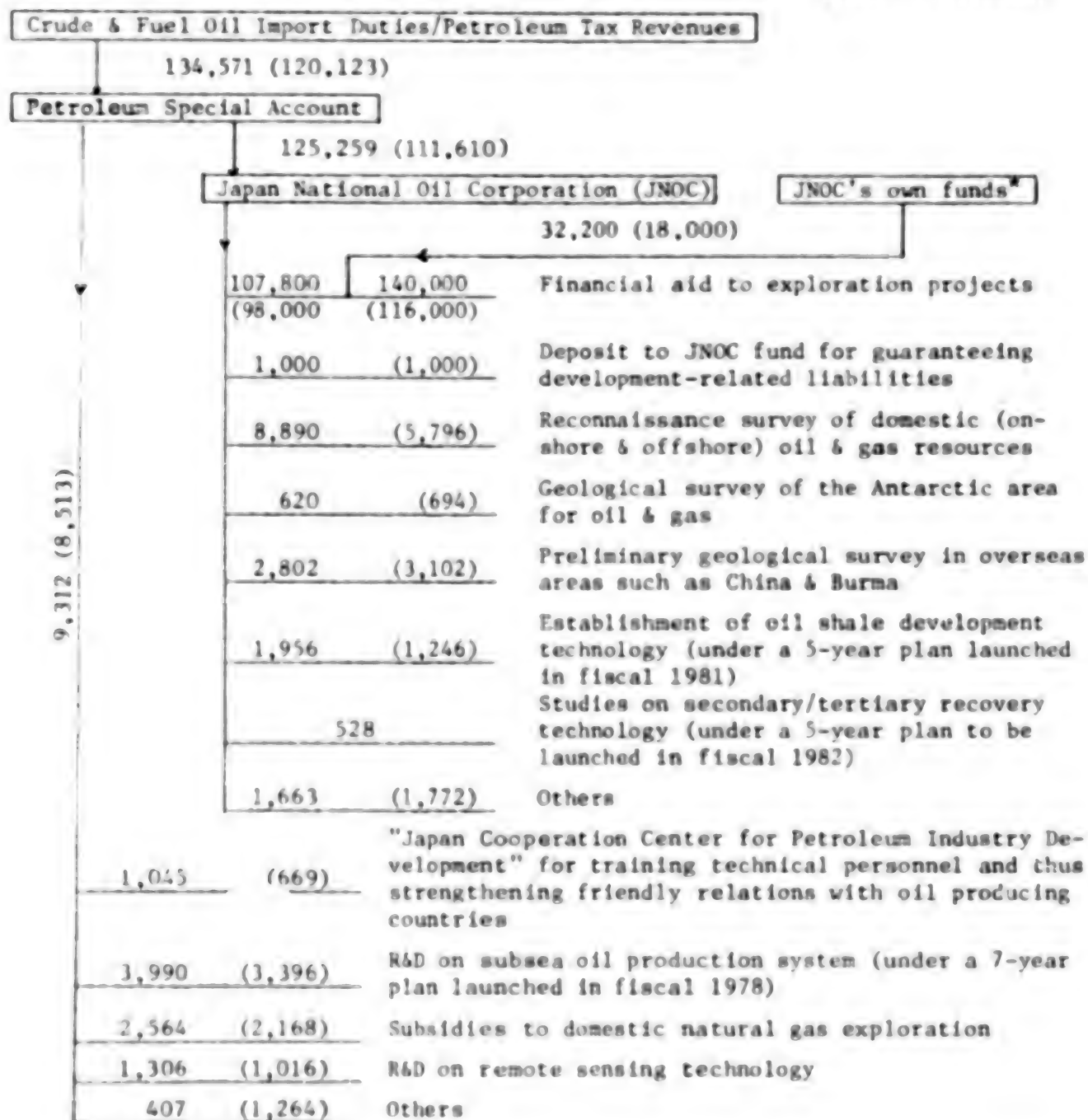
Fiscal Year	Crude Oil (1,000 b/d)	Natural Gas (mmcf/d)	Total (Crude Oil Equiv.) (1,000 b/d)	Imports of Japanese-Developed Crude Oil in Overseas Areas
1971	14.9	235	56.8	335
1972	14.3	243	57.6	360
1973	14.1	253	59.2	424
1974	13.0	242	56.2	474
1975	12.0	236	54.0	400
1976	11.9	252	39.5	414
1977	11.6	268	59.4	408
1978	10.5	250	55.0	509
1979	9.5	227	49.9	524
1980	8.3	208	45.4	381

(Source: Natural Resources & Energy Agency)

Fiscal 1982 budget appropriations for oil & gas exploration and development projects will be ¥134,571 million (\$585 million), a 12.0 percent increase over the previous year's budget. Of the total amount of ¥134,571 million, ¥125,259 million (\$545 million), or 93 percent, will be allocated to the governmental Japan National Oil Corp. for implementation of a number of projects by JNOC. The allocation to JNOC represents a 12.2 percent increase. A detailed breakdown of these budget appropriations are as shown in the following diagram:

Fiscal 1982 Budget--Petroleum Special Account for Oil & Gas Exploration and Development (Figures in brackets indicate the budget for fiscal 1981)

(Unit: ¥ Million)



(*) Carryover from the previous year, repayment of JNOC loans, dividend payment to JNOC, etc.

II. Oil & LPG Stockpile Expansion Projects

JNOC, in addition to extending financial aid to promote oil & gas exploration and development projects, is playing an essential role to expand and maintain the nation's oil & LPG stockpiles.

The legal basis for JNOC's participation in the oil/LPG stockpiling projects is the Japan National Oil Corporation Law (Law No 99 of 1967) and the Petroleum Stockpile Law (Law No 96 of 1975). Under revisions of these laws, JNOC is now empowered not only to provide financial aid to private refiners/LPG importers and joint JNOC-industry oil/LPG stockpiling companies but also to possess and expand its own crude oil stockpiles--currently stored in tankers but later (beginning in 1983) to be transferred to permanent stockpiling facilities now under construction in several locations.

As reported previously (JPEW, Feb. 1--p 7), Japan's oil stockpiles as of December 31, 1981, totaled 73,680 thousand kiloliters (463.4 million barrels) in terms of fuel products. Of these stockpiles, the privately owned stockpiles including those owned by joint JNOC-industry stockpiling companies) were 63,259 thousand kl (397.9 million barrels) with the remainder entirely owned by JNOC, representing 101.2 and 16.7 days' supply, respectively, based on the domestic consumption in calendar 1980.

Meanwhile, the LPG stockpiles as of the same date totaled approximately 330 thousand metric tons, which accounted for 12.5 days' supply based on the LPG imports in calendar 1980. Because of the fact that the Petroleum Stockpile Law has been expanded to include LPG from fiscal 1981, it may be some time before precise LPG stockpile figures as defined by the law become available monthly. Inventories coming under control of the law are limited to those at LPG import terminals, primary and secondary, earmarked for stockpile build-up purposes. Hence their figures are considerably below the inventory figures published by the Ministry of International Trade and Industry which also include other than those at import terminals. For example, the foregoing figure of 330 thousand metric tons compares with 1,221 thousand metric tons of published inventories.

The MITI-set target for oil/LPG stockpile expansion calls for:

- maintaining the privately owned oil stockpiles, which had reached the 90 days' supply level by the end of fiscal 1979, to assure the present level of 90 days' supply or more,

- increasing the privately owned LPG stockpiles to the 15 days' supply level by the end of fiscal 1981 (i.e., March 31, 1982); to the 20 days' supply level by the end of fiscal 1982; and eventually to 50 days' supply level by the end of fiscal 1988.

- increasing the JNOC-owned crude oil stockpiles to the 30 days' supply level at the soonest possible date.

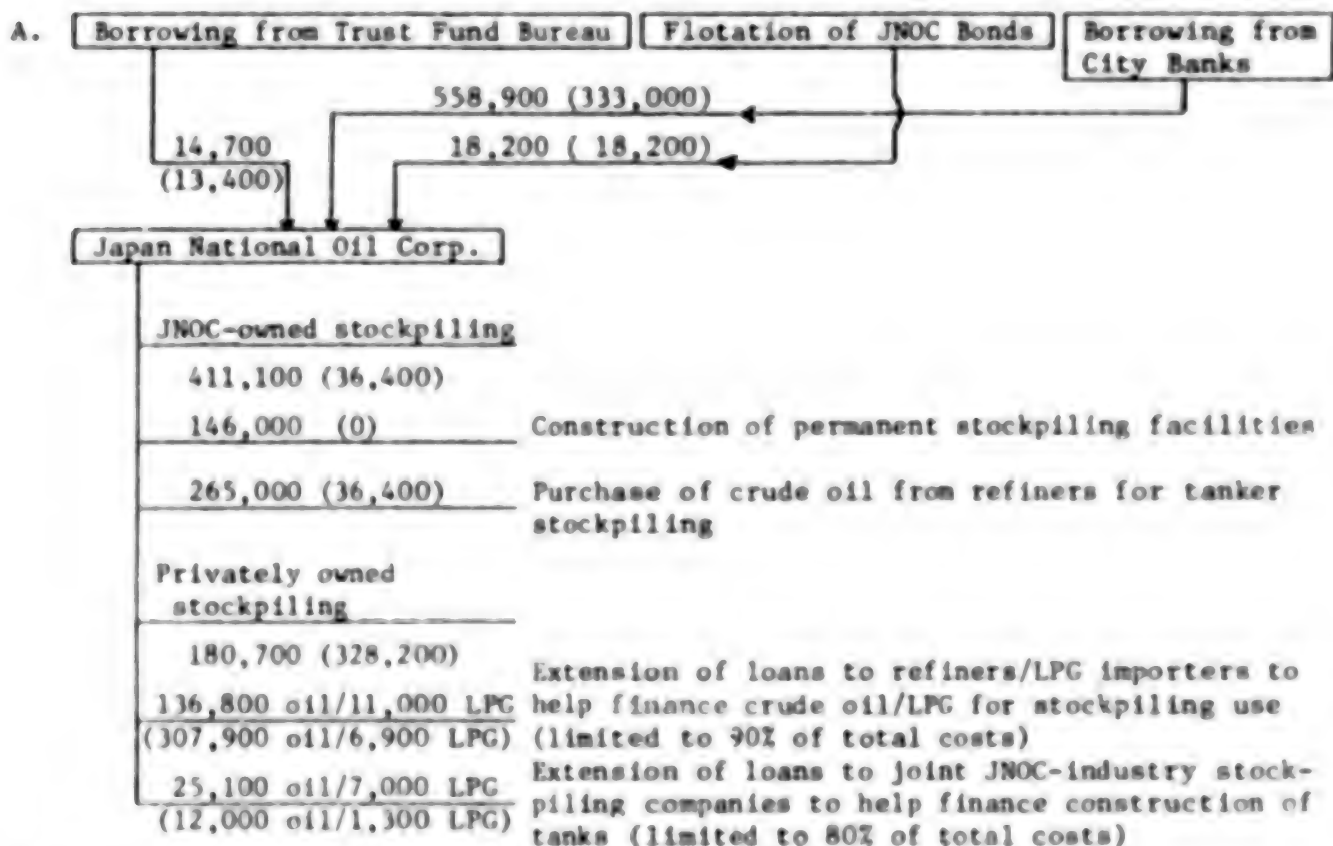
Fiscal 1982 budget appropriations for oil/LPG stockpile expansion projects outlined above will total ¥201,062 million (\$874 million) under the Petroleum Special Account and ¥591,800 million (\$2,573 million) under the Fiscal Loans and Investment Program, a breakdown of which is as shown below and also in the following two diagrams (with one diagram shown on the following page):

(Unit: ¥ Million)	Imple- mented by MITI	Implemented by JNOC		
		Private Stock- piling	JNOC-Owned Stock- piling	Total
Petroleum special account	12,422	39,547	149,093	201,062
Fiscal loans & investment program	0	180,700	411,100	591,800
	12,422	220,247	560,193	792,862

In addition, there will be Japan Development Bank loans (to be appropriated as needed from a total framework of ¥55,000 million, \$239 million, earmarked for oil-related projects) and Okinawa Development Finance Corp. loans (to be appropriated from a total framework of ¥35,500 million, \$154 million, earmarked for industrial development projects in Okinawa), to be extended to refiners and LPG importers to help finance construction of tanks.

Fiscal 1982 Budget--Fiscal Loans & Investment Program for Oil/LPG Stockpile Expansion (Figures in brackets indicate the budget for fiscal 1981)

(Unit: ¥ Million)



B. Japan Development Bank/Okinawa Development Finance Corp.

To be appropriated as needed from a framework totaling 90,500 (85,000)	Extension of loans to refiners/LPG importers to help finance construction of tanks (limited to 70% of total costs)
--	--

Fiscal 1982 Budget--Petroleum Special Account for Oil & LPG Stockpile Expansion
(Figures in brackets indicate the budget for fiscal 1981)

(Unit: ¥ Million)

Crude & Fuel Oil Import Duties/Petroleum Tax Revenues	
201,062 (169,570)	
Petroleum Special Account	
188,640 (160,529)	
Japan National Oil Corp.	
JNOC-owned stockpiling	
149,093 (130,732)	Land acquisition for permanent stockpiling facilities and equity participation in JNOC-controlled stockpiling companies
17,100 (56,000)	Tanker charterage (for stockpiling in tankers) and related expenses
86,823 (52,571)	Studies on 30-million-kl stockpiling in permanent facilities
2,043 (2,593)	Grants-in-aid for paying a fixed rate of interest on borrowing to purchase JNOC-owned crude oil for stockpiling in tankers
37,872 (19,568)	Grants-in-aid for paying a fixed rate of interest on borrowing to construct permanent stockpiling facilities
5,255 (0)	
Privately-owned stockpiling	
39,547 (29,797)	Equity participation in JNOC-industry stockpiling companies (limited to 2/3 of land acquisition costs, but no more than 2/15 of total costs)
5,160 oil/1,600 LPG (0 oil/0 LPG)	Grants-in-aid for paying a fixed rate of interest on refiners' and LPG importers' borrowing to purchase oil/LPG for stockpiling use
31,259 oil/329 LPG (29,096 oil/102 LPG)	Grants-in-aid for paying a fixed rate of interest on joint JNOC-industry stockpiling companies' borrowing to construct tanks
886 (405)	Studies on underground oil stockpiling
313 (194)	
10,549 (8,019)	Governmental grant of premium money* to local governments cooperating with oil/LPG stockpiling projects
1,367 oil/506 LPG (781 oil/239 LPG)	Grant-in-aid for paying a fixed rate of interest on Japan Development Bank/Okinawa Development Finance Corp. loans to refiners/LPG importers to help finance construction of oil/LPG tanks

* Rate of premium: --New facilities ¥800/m³ of stockpiling capacity for a 2-3 year period of construction

--Existing facilities

Stockpiling Capacity (V), mil.m ³	Premium (A), ¥ mil./year
0.1 - 1.0	A = 49.5V + 11.55
1.0 - 2.0	A = 33.0V + 28.05
2.0 - 5.0	A = 16.5V + 61.05
5.0 - 10.0	A = 3.85V + 124.1
10.0 or more	A = 0.44V + 158.4

LPG stockpiling capacities (normally expressed in terms of metric tons) are converted to capacities in terms of m³ by multiplying by 1.8, before the foregoing formula is applied.

Tanker stockpiling ¥125/kl/year of oil stockpiled in tankers

III. R&D on Residual Oil Processing and Petroleum Alternatives Development

The issue of residual oil processing is becoming increasingly pressing as the world crude oil mix is becoming heavier, while the trend in Japan's pattern of domestic consumption is toward a lighter product mix.

To cope with these trends, the Research Association for Residual Oil Processing (RAROP) was established on June 18, 1979, jointly by 14 refining firms, 7 iron & steel companies, 4 engineering & heavy industries firms, and 9 electric utilities represented by the Central Research Institute of Electric Power Industry.

RAROP's original 4-year plan (fiscal 1979-1982), which called for an expenditure of ¥18,000 million for R&D on residual oil processing, was revised in fiscal 1981 to a 5-year plan (fiscal 1979-1983) with a budget of ¥25,000 million (\$109 million). Government subsidies will underwrite 75 percent of the expenditure, with the private sector sharing the remaining portion.

The scope of RAROP's studies include: i) development of cracking processes, ii) development of technologies that will permit the use of low-quality residual oil as a raw material in the iron & steel industry, and iii) development of pitch/asphalt/coke burning technology.

In an effort to expedite the 5-year plan, RAROP has launched a further 4-year plan (fiscal 1982-1985) specifically calling for i) development of a process for hydrocracking residual oil by modifying an existing residual oil hydrodesulfurization unit and by using a 10,000 b/d pilot plant to produce middle distillate fuels with a newly developed catalyst, and ii) development of a process for catalytic cracking of residual oil, also for producing middle distillate fuels with a newly developed catalyst.

The Research Association for Petroleum Alternatives Development (RAPAD) was established on June 5, 1980, jointly by 9 refining firms, 4 fermentation firms, 3 chemical firms, and 7 engineering and heavy industries firms. The formation of RAPAD is intended to promote R&D on petroleum alternatives development by: i) production of hydrocarbon oils or oxygen-containing fuel oils (which can be blended into motor gasoline--known as "gasohol") from synthesis gas (i.e., CO and H₂), ii) refining and upgrading of tar sand bitumens and shale oils, and iii) biomass conversion for fuel ethanol fermentation.

The word "petroleum alternatives" as used here can be defined as new liquid fuels to be produced to supplement conventional gasoline and middle distillate fuels, supply and distribution of which will be carried out through the existing oil product marketing and distribution system, and hence differ from the "non-petroleum, alternative energies" such as coal, LNG, nuclear, solar and geothermal energy, etc.

The foregoing R&D programs are being implemented under the 7-year plan (fiscal 1980-1986) with an expenditure of ¥38,800 million (\$169 million). Government funds are provided to finance two-thirds of the total expenditure, with the remaining one-third shared by the private sector.

Fiscal 1982 budget appropriations for residual oil processing and petroleum alternatives development will total ¥18,776 million (\$82 million), a breakdown of which is as shown below:

Fiscal 1982 Budget--Petroleum Special Account for R&D on Residual Oil Processing and Petroleum Alternatives Development (Figures in brackets indicate the budget for fiscal 1981)

(Unit: ¥ Million)

Crude & Fuel Oil Import Duties/Petroleum Tax Revenues		
18,776 (16,303)		
Petroleum Special Account		
▼	8,208 (6,839)	
	RAROP	
	3,986 (5,704)	Subsidies to R&D on residual oil cracking
	1,223 (0)	Subsidies to R&D on hydrocracking and catalytic cracking or residual oil
	2,999 (1,135)	Subsidies to R&D on effective utilization of low-quality residues
▼	3,899 (4,182)	
▼	RAPAD	
	3,283 (3,566)	Subsidies to R&D on petroleum alternatives development
	616 (616)	Studies on petroleum alternatives development
	6,669 (5,282)	
	149 (0)	Feasibility studies on construction of joint residual oil processing centers--at two locations at home and one location abroad
	345 (238)	Studies on measures to assure supplies of oil products for household use
	6,175 (5,044)	Others

Preliminary Oil Statistics for December 1981 - Part II

	December 1981			December 1980		
	Kiloliters	TBD	%	TBD	%	% Change
<u>Domestic Consumption</u>						
Gasoline	3,476,042	706	17.3	690	16.2	+ 2.3
Naphtha	1,978,511	401	9.8	489	11.5	-18.0
Jet fuel	156,694	32	0.8	53	1.2	-39.6
Kerosine	4,067,146	825	20.2	759	17.9	+ 8.7
Gas oil	2,061,100	418	10.3	405	9.6	+ 3.0
Fuel oil A	2,251,706	457	11.2	449	10.6	+ 1.8
Fuel oil B	408,908	83	2.0	105	2.5	-21.0
Fuel oil C	5,701,743	1,157	28.4	1,297	30.5	-10.8
	<u>8,362,357</u>	<u>1,697</u>	<u>41.6</u>	<u>1,851</u>	<u>43.6</u>	<u>- 8.3</u>
TOTAL	<u>20,101,850</u>	<u>4,079</u>	<u>100.0</u>	<u>4,248</u>	<u>100.0</u>	<u>- 4.0</u>
<u>Product Imports*</u>						
Gasoline	12	-		-		-
Naphtha	730,587	148		102		+45.1
Jet fuel	-	-		8		-
Kerosine	108,317	22		15		+46.7
Gas oil	30,482	6		10		-40.0
Fuel oil A	155,809	32		12		2.7-fold
Fuel oil C	449,648	91		103		-11.7
	<u>605,457</u>	<u>123</u>		<u>115</u>		<u>+ 7.0</u>
TOTAL	<u>1,474,855</u>	<u>299</u>		<u>250</u>		<u>+19.6</u>
<u>Product Exports**</u>						
Jet fuel	144,323	29		29		-
Kerosine	7	-		-		-
Gas oil	11,270	2		2		-
Fuel oil A	39,594	8		7		+14.3
Fuel oil B	1,929	-		1		-
Fuel oil C	534,133	109		209		-47.8
	<u>575,656</u>	<u>117</u>		<u>217</u>		<u>-46.1</u>
TOTAL	<u>731,256</u>	<u>148</u>		<u>248</u>		<u>-40.3</u>
<u>LPG Supply & Demand (Unit: metric tons)</u>						
Local production***	704,807			674,378		+ 4.5
Imports	813,790			811,400		+ 0.3
Domestic consumption***	1,651,678			1,514,503		+ 9.1

* Exclude bonded product imports.

** Exclude part of bonded product exports that are imported as bonded for subsequent exports as bonded.

*** Includes C₃ and C₄ fractions produced at petrochemical plants which are used for subsequent processing to produce derivatives.

Preliminary Oil Statistics for Calendar 1981 - Part II

	Calendar 1981			Calendar 1980		
	1,000 KL	TBD	%	TBD	%	% Change
<u>Domestic Consumption</u>						
Gasoline	35,287	608	17.7	595	16.1	+ 2.2
Naphtha	23,893	412	12.0	487	13.2	-15.4
Jet fuel	2,822	49	1.4	51	1.4	- 3.9
Kerosine	24,429	421	12.3	403	10.9	+ 4.5
Gas oil	21,902	377	11.0	370	10.0	+ 1.9
Fuel oil A	20,524	354	10.3	365	9.9	- 3.0
Fuel oil B	4,345	75	2.2	97	2.6	-22.7
Fuel oil C	65,878	1,135	33.1	1,328	35.9	-14.5
	90,747	1,564	45.6	1,790	48.4	-12.6
TOTAL	199,080	3,431	100.0	3,696	100.0	- 7.2
<u>Product Imports*</u>						
Naphtha	7,241	125		127		- 1.6
Jet fuel	-	-		1		-
Kerosine	928	16		1		16.0-fold
Gas oil	541	9		2		4.5-fold
Fuel oil A	1,278	22		18		+22.2
Fuel oil C	6,124	106		110		- 3.6
	7,402	128		128		-
TOTAL	16,112	278		259		+ 7.3
<u>Product Exports**</u>						
Jet fuel	1,695	29		32		- 9.4
Kerosine	4	-		-		-
Gas oil	175	3		2		+50.0
Fuel oil A	608	10		9		+11.1
Fuel oil B	29	-		1		-
Fuel oil C	9,684	168		143		+17.5
	10,321	178		153		+16.3
TOTAL	12,195	210		187		+12.3
<u>LPG Supply & Demand (Unit: metric 1,000 tons)</u>						
Local production***		7,780		7,995		- 2.7
Imports		10,099		9,725		+ 3.8
Domestic consumption***		15,525		14,932		+ 4.0

* Exclude bonded product imports.

** Exclude part of bonded product exports that are imported as bonded for subsequent exports as bonded.

*** Includes C₃ and C₄ fractions produced at petrochemical plants which are used for subsequent processing to produce derivatives.

CSO: 4120/167

CHANGES IN NATION'S ENERGY SCENE NOTED

Tokyo JAPAN PETROLEUM & ENERGY WEEKLY in English Vol 17 No 4, 25 Jan 82 pp 1-3, 12

[Article: "Japan's Energy Scene Undergoing Structural Change"]

[Text]

A major change has taken place in recent years in the Japanese energy supply and demand situation. Several factors are responsible for this change: a slowdown in economic growth, progress achieved in energy conservation, rapid inroads into the energy market by alternative energies such as natural gas, coal, nuclear energy and the resultant intensifying of price competition among energies.

Japan's primary energy consumption in fiscal 1980 dropped 3.2 percent from that of the preceding year (JPEW, December 28, 1981 - p.3). For the second consecutive year, total primary energy consumption is believed certain to show an annual decline in fiscal 1981 (ending March 31, 1982) in all areas, including industry, household & commercial, and transportation sectors. Of particular interest is the fact that inter-energy position among major secondary energies such as electricity, city gas and petroleum products is undergoing a considerable change in the midst of an overall decline in energy consumption.

Shown below are the primary as well as secondary energy consumption results for the April-September 1981 period (i.e., the first half of fiscal 1981) in comparison with that for the corresponding period of a year earlier:

	April-Sept. 1981	April-Sept. 1980	% Change ('81 vs '80)
Steam coal, 1,000 tons	12,429	8,351	+48.8
City gas, billion kcal	41,915	39,576	+ 5.9
Electricity, million kwh	237,643	233,921	+ 1.6
Nuclear power generation, million kwh	45,290	41,086	+10.2
LPG, 1,000 tons	7,221	6,997	+ 3.2
LNG*, 1,000 tons	8,223	8,302	- 1.0
Oil**, 1,000 kl	89,219	97,030	- 8.1
1,000 b/d	3,067	3,335	
Middle distillates***, 1,000 kl	25,952	26,030	- 0.3
1,000 b/d	892	895	
Fuel oil C, 1,000 kl	30,824	36,525	-15.6
1,000 b/d	1,059	1,255	

(*) Import basis. (**) Fuel products only. (***) Kerosine, gas oil, and fuel oil A.

What these figures demonstrate is that competition is increasing among various forms of energy and the market mechanism is beginning to function more severely, giving consumers a choice in price and quality. In particular, the increasing consumption of coal, nuclear power, city gas and LPG at the sacrifice of oil shows quite clearly that alternative energy sources are making significant inroads into the oil market -- more rapidly in the fuel oil C market than for middle distillates.

The primary reason for this structural change in energy consumption pattern is the energy-to-energy price differential. Based on the fuel consumption in fiscal 1980 by nine major electric utilities -- i.e., Japan's largest single oil-consuming industry -- the comparative costs of four major fuels consumed for thermal power generation were as follows:

	<u>¥/1,000 kcal</u>	<u>\$/million Btu</u>
Coal	2.58	2.96
Fuel oil C	5.94	6.80
Crude oil	5.86	6.71
LNG	4.90	5.61

The following table also illustrates the decided economic disadvantage of oil in terms of electric power generation cost vis-a-vis coal and nuclear:

	<u>Power Generating Cost, ¥/kwh</u>
Nuclear	8 - 9
Coal	12 - 13
Oil	17 - 18

As shown above, fuel oil is losing its competitiveness vs coal, LNG, and nuclear as a major fuel for electric power generation, while middle distillate fuels are becoming less competitive vs LPG and LNG as a clean fuel for industrial use. LNG, in addition to its major role in the electric power generation and city gas production, is looming as a fuel alternative to middle distillates in the industrial sector. As an example, industrial LNG (as supplied by city gas companies) has come to be considered cheaper than oil as a fuel for factory boilers, and therefore, numerous conversions are occurring from oil to LNG. In terms of calories, the current price of middle distillates at approximately \$9.30 per million Btu compares unfavorably with that of LNG import price (c.i.f.) at around \$6.10 per million Btu.

Regarding LNG prices, Japanese LNG consumers are becoming increasingly concerned over the LNG pricing formula now in effect, claiming that it is responsible for the current LNG prices which are increasing vis-a-vis declining crude oil and LPG prices. While the world oil and LPG glut situation began softening the crude oil and LPG market in 1981, LNG prices became even higher in terms of calories based on c.i.f. prices, as compared below:

	Crude Oil		LPG		LNG	
	<u>\$/bbl</u>	<u>\$/mil.Btu*</u>	<u>\$/ton</u>	<u>\$/mil.Btu**</u>	<u>\$/ton</u>	<u>\$/mil.Btu***</u>
1980: December	34.80	5.87	333.99	6.96	291.61	5.61
1981: March	38.21	6.44	340.10	7.09	300.10	5.77
June	38.42	6.48	318.16	6.63	297.94	5.73
September	36.79	6.20	290.41	6.05	303.90	5.84
November	36.63	6.18	289.43	6.03	317.03	6.10

(*) One bbl of crude oil is assumed to be equivalent to 5.93 million Btu.

(**) One metric ton of LPG is assumed to be equivalent to 48 million Btu.

(***) One metric ton of LNG is assumed to be equivalent to 52 million Btu.

In an effort to lower the LNG prices to more competitive levels in line with crude oil and LPG prices, the Japanese LNG consumers are proposing to review the current formula of linking the LNG price to the crude oil price and to moderate the "take-or-pay" clause presently imposing heavy burdens on the LNG buyers.

As long as fuel oil prices remain uncompetitive with alternative energy prices amidst a nationwide energy demand slump, an even greater decline in fuel oil demand can be expected. Meanwhile, fuel oil C, together with fuel oil B, now account for approximately 35 percent of total refinery production. Under these circumstances, it will be necessary either to reduce refinery crude runs to a level at which the fuel oil C/B supply and demand balance can be maintained, or to convert surplus fuel oil into lighter products equivalent to middle distillate fuels. A problem which remains, however, is the difficulty of converting fuel oil to lighter products competitive enough in prices with alternative energies in a market where the price mechanism continues to function. This constitutes one of the most serious issues now pressing the Japanese oil industry.

In addition, not only is there intensifying price competition among energies, it is also certain that within the next several years the oil-producing nations of the Middle East will begin to export petroleum products. It will therefore become necessary for Japan, which now relies on the Middle East for approximately 70 percent of its crude imports, to shift to an open system permitting importation of petroleum products from these nations.

In order to solidify Japan's basis for economic security in the midst of such fluid and major structural changes in the domestic and overseas energy markets, not the oil industry nor the industrial circles nor the government will be permitted to cling persistently to the existing market framework. The greater elasticity among energy-related industrial sectors, also between the oil industry and the government, as well as in the operation of the energy system itself, will be imperative.

In this respect, it is quite appropriate that the Petroleum Council recently called for elimination of excessive administrative interference with oil industry matters, instead of proposing that emphasis be placed on the market mechanism (JPEW, December 28, 1981 -- pp.1/2). As the picture shifts from a

petroleum-dominated energy market to one of competition among energy sources and of policy choices of the electric power and city gas industries of the most economical energy mix, the urgency than ever before of the need to realize the importance of such energy strategies goes without saying, and policies in this area should be implemented swiftly and flexibly.

CSO: 4120/166

SCIENCE AND TECHNOLOGY

NATION'S OIL EXPLORATION; DEVELOPMENT ACTIVITIES NOTED

Tokyo JAPAN PETROLEUM & ENERGY WEEKLY in English Vol 17 No 4, 25 Jan 82 pp 6-9

[Text]

The company was established on February 13, 1981, jointly by the governmental Japan National Oil Corp. (JNOC) and a consortium of 44 private firms, to participate in the Dome Petroleum's Beaufort Sea oil and gas exploration & development project in Canada. The primary objectives of the company formation include: raising government and private funds; extending loans to Dome Petroleum; and receiving oil from Dome.

An official agreement was signed on February 16, 1981, between the company and Dome Petroleum on joint exploration and development in an area (gross working interest - 46,609 km²; 11.5 million acres; net working interest - 19,255 km²; 4.8 million acres) in the frigid Beaufort Sea. Under the agreement:

- APC will provide 400 million Canadian dollars in loans to Dome to help finance its five-year exploration program to be carried out through 1984. Dome will repay the principal of the exploration loan and pay the remuneration, together, in the form of about 50 million barrels of oil to APC.
- APC will have an option to advance loans for 10-25 percent of Dome's expenditures to develop three oilfields to be selected by APC. The principal and interest of these development loans will be repaid in oil. Moreover, APC will be entitled to purchase Dome's oil throughout the life of the fields in accordance with APC's share in the development expenditures. Assuming that APC will share a 25 percent working interest in Dome's project for development of three oilfields of Kopanoar's scale, APC is expected to extend a loan totaling about C\$2,250 million in 1980 prices, and will be entitled to receive/purchase approximately 700 million barrels of oil, in return, over 21 years starting 1987.
- APC will have an opportunity to participate in the research program for Arctic oil operations (referred to as the Arctic Exploration Research Program; AERP) and will have access to technical information to be obtained therefrom.

As of the end of 1981, a total of 14 exploratory/outpost wells have been drilled, seven of which proved successful, as shown below. Both outpost drilling for the

Kopanoar structure and exploratory drilling for the Koakoak structure proved successful in 1981 -- i.e., after APC's participation in Dome's project -- confirming the "original oil in place" at 1.8-4.5 and 2.0-5.0 billion barrels, respectively.

Well	Drilling		Test Depth, ft	Test Results		API
	Started	Ended		Oil, b/d	Gas, mmcf/d	
Nekktonalik K-59	Sept. 1976	Oct. 1977	8,817-8,836	1,150	0.9	27
Kopanoar M-13	Sept. 1976	Sep. 1979	11,467	6,000	4.5	28
Ukalerk C-50	Jul. 1977	Oct. 1977	6,580-6,599	-	16.9	-
Ukalerk 2C-50	Jul. 1978	Aug. 1979	6,580	-	3.0	31
Tarsuit A-25	Oct. 1978	Jul. 1980	4,910	800	3.2	31
Kopanoar 21-44	Jul. 18, 1981	Oct. 29, 1981	9,711-10,522	1,670	4.8	28
Koakoak 0-22	Jul. 19, 1981	Nov. 1, 1981	10,853-11,468	3,330	25.09	28

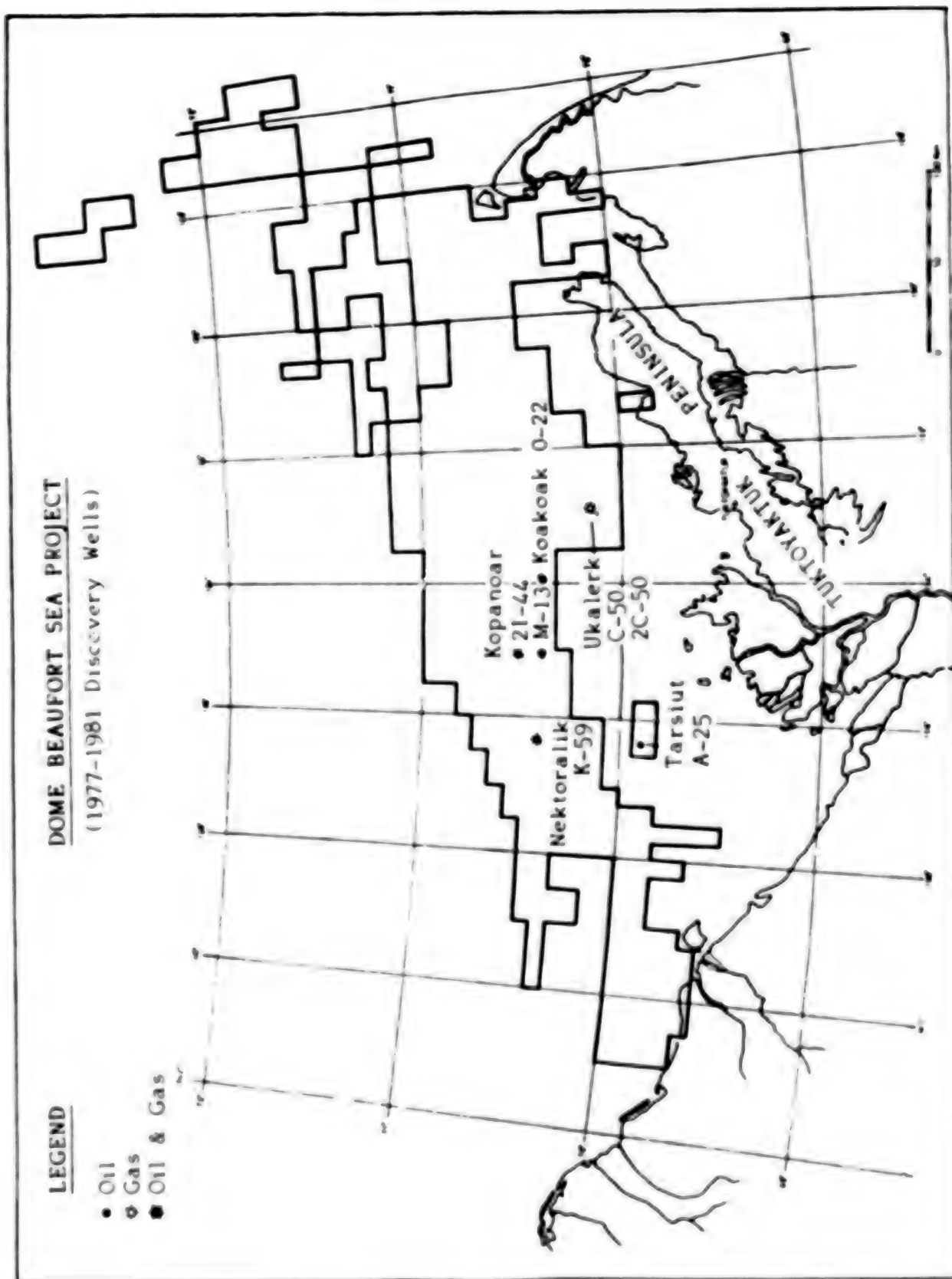
Meanwhile, a man-made island called "Arctic Production & Loading Atoll (APLA)" has been completed near the Tarsuit A-25 well (which was found successful in 1980) for outpost drillings for the Tarsuit structure, while another APLA is now under construction near the Ukalerk C-50 well (which was found successful in 1977).

Summarized below are cash and oil flows corresponding to Japan's extension of exploration and development loans to the Beaufort Sea project:

Exploration expenses (1980-1984)		C\$ Million
Total		2,547
Dome's share		1,558
APC's share: 1981		300
1982		100
		400
Development expenditures (1982-1995)		
Total		18,000
Dome's share @50%		9,000
APC's share @25% of Dome's share		2,250
AERP (1979-1981)		
Total		45
Dome's share		15
APC's share		15
Oil production and its distribution (21 years; 1987-2007)		
	Cumulative mil. bbls	Daily Average (Peak) 1,000 b/d
Total	6,000	784 (1,480)
Dome's share @50%	3,000	392 (740)
APC's share @25% of Dome's share	750*	98 (185)

APC is presently capitalized at ¥43,855.5 million (US\$195 million) as of December 9, 1981, when its capital stock was last raised, with 45 shareholders having equity interests as shown below. While JNOC has a 60 percent equity interest in APC, it is expected that JNOC provides an 80 percent of total funds required to promote the project, with the private sector sharing a 20 percent.

Shareholder	Y Million	% Share
. Japan National Oil Corp.	26,313	60.0
. 13 Oil Exploration/Development Firms:		
Overseas Petroleum Corp.	3,600	8.2
Indonesia Petroleum, Ltd.	2,700	6.2
Japan Petroleum Exploration Co.	960	2.2
Mitsui Oil Exploration Co.	750	1.7
Sumitomo Petroleum Development Co.	525	1.2
Mitsubishi Petroleum Development Co.	322	0.7
Mitsubishi Mining & Cement Co.	285	0.6
International Resources Co./Teikoku Oil Co.	225 each	1.0
Central Petroleum Development Co./Fuyo Petroleum)	
Development Co./Toyo Oil Development Corp./World) 150 each	1.4
Energy Development Co.)	
	10,192	23.2
. 18 Petroleum Refining & Marketing/Primary Distribution Firms:		
Idemitsu Kosan Co.	750	1.7
Toa Nenryo Kogyo K.K.	600	1.4
Showa Oil Co.	562	1.3
Mitsubishi Oil Co.	480	1.1
Nippon Oil Co.	375	0.9
Daikyo Oil Co./Nippon Mining Co.	300 each	1.4
Maruzen Oil Co.	268.5	0.6
Asia Oil Co.	232	0.5
General Sekiyu K.K.	230	0.5
Fuji Oil Co./Seibu Oil Co.	195 each	0.9
Kyodo Oil Co.	182	0.4
Kashima Oil Co.	180	0.4
Kyushu Oil Co.	177	0.4
Kyokuto Petroleum Industries, Ltd.	135	0.3
Fuji Kosan Co./Taiyo Oil Co.	75 each	0.3
	5,311.5	12.1
. 7 Shipbuilding Firms:		
Hitachi Shipbuilding & Engineering Co.)	
Ishikawajima-Harima Heavy Industries, Ltd.)	
Kawasaki Heavy Industries, Ltd.)	
Mitsubishi Heavy Industries, Ltd.) 135 each	2.2
Mitsui Engineering & Shipbuilding Co.)	
Nippon Kokan K.K.)	
Sumitomo Heavy Industries, Ltd.)	
	945	2.2
. 6 Trading Firms:		
Mitsubishi Corp.	270	0.6
Marubeni Corp./Sumitomo Corp.	187 each	0.9
C. Itoh & Co./Mitsui & Co./Nissho-Iwai Co.	150 each	1.0
	1,094	2.5
TOTAL	43,855.5	100.0



SCIENCE AND TECHNOLOGY

PRESENT STATUS OF JAPAN'S OFFSHORE OIL, GAS EXPLORATION, DEVELOPMENT ACTIVITIES

Tokyo JAPAN PETROLEUM & ENERGY WEEKLY in English Vol 17 Nos 1&2, 4, 11 Jan 82
pp 16-17

[Text]

Nippon Oil Exploration Co., Ltd.

Two exploratory wells were drilled in 1980 and one well in 1981, with the drilling of the third well ending December 14, 1981, on the continental shelf between Japan and the Republic of Korea (ROK), as described on the next page. All these wells were dry. Plans for further exploration have yet to be determined.

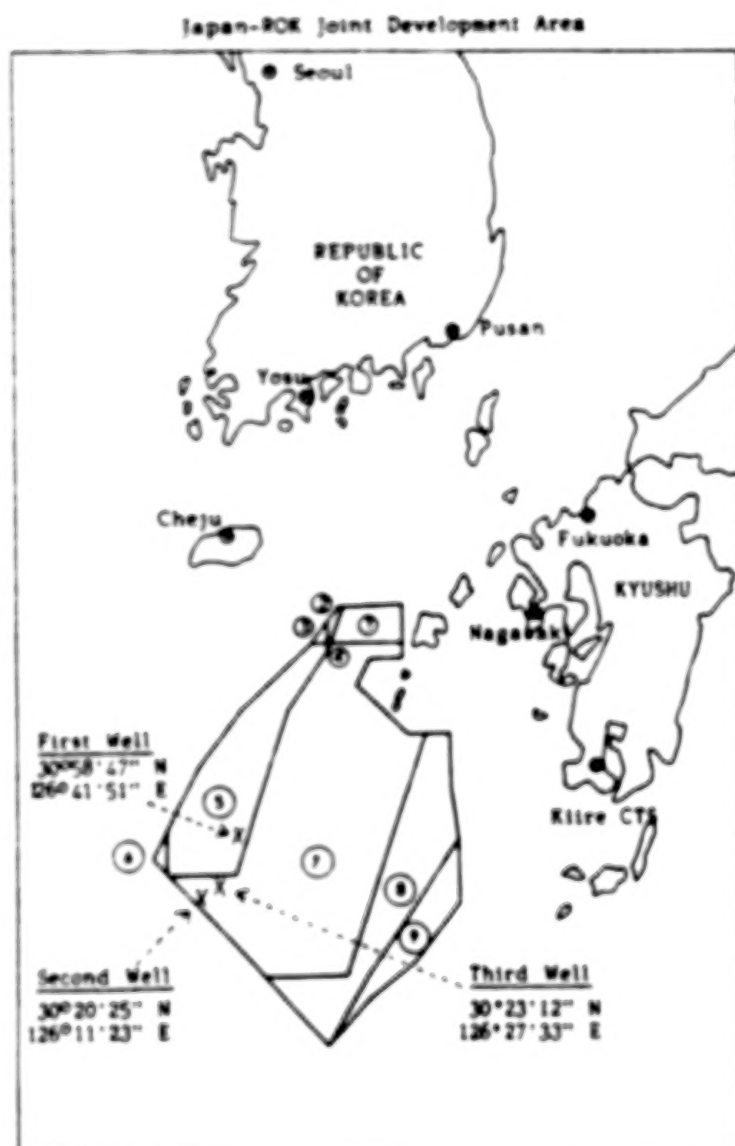
The exploration on the Japan-ROK continental shelf (82,645 km², 31,910 sq mi, comprising nine subzones) was started under a joint exploration/development agreement approved on May 18, 1979, by the two parties. Operators for exploration and development of subzones 2 through 7 (in which Nippon Oil Exploration is involved) are as follows:

Subzone	Area, km ²	Operator	
		Exploration	Development
2	255	Nippon Oil Exploration	Texaco
3	113	"	"
4	17	"	"
5	12,481	"	"
6	119	"	"
7	40,551	Hamilton Brothers	Nippon Oil Exploration
	53,536		

In addition to the foregoing areas for joint operation, there is another area (26,134 km², 10,090 sq mi) off Shikoku, in which Nippon Oil Exploration is the sole prospector.

Chevron and Texaco, which are parent companies of Caltex, with which Nippon Oil is affiliated, had agreed to finance the initial exploration expenses up to US\$10 million for exploration on the Japan-ROK continental shelf and US\$1.8 million for exploration off Shikoku. The expenses for the former exceeded US\$10 million a couple of years ago, and Nippon Oil, Chevron and Texaco now share the expenses relating to the Japan-ROK joint exploration on a 50:25:25 basis.

Company	Location	Drilling	Rig Released	Total Depth		Results	Rig Used
		Spudded/Ended		Meters	Feet		
Nippon Oil Exploration/Chevron/Texaco (50:25:25): Japan-ROK Continental Shelf							
Well #1 (Subzone #5)	126°41'51" E 30°58'47" N	May 6, 1980 Jul. 4, 1980	Jul. 8, 1980	3,317	10,880	Dry	Hakuryu #3
Well #2 (Subzone #7)	126°11'23" E 30°20'25" N	Jul. 12, 1980 Oct. 20, 1980	Oct. 29, 1980	4,486	14,710	Dry	Hakuryu #3
Well #3	126°27'33" E 30°23'12" N	Oct. 5, 1981 Dec. 14, 1981	Dec. 21, 1981	4,190	13,740	Dry	Hakuryu #5
Nippon Offshore Oil							
Off Shiretoko #1	144°36'45" E 44°01'48" N	May 27, 1980 Jul. 1, 1980	Jul. 12, 1980	1,994	6,540	Dry	Hakuryu #2



Nippon Oil Exploration Co. was established on December 10, 1968, as a wholly owned subsidiary of Nippon Oil Co. It is now capitalized at ¥5,500 million.

Nippon Offshore Oil Co., Ltd.

The company was established on May 25, 1979, as a subsidiary of Alaskan Petroleum Development Co. (APDC) to inherit the prospecting right in an area (2,636 km², 1,018 sq mi), which APDC had obtained off the Shiretoko Peninsula in the Sea of Okhotsk. An exploratory well was drilled in mid-1980.

The company is now capitalized at ¥1,112 million, with the following six shareholders owning equity shares as shown below: Japan National Oil Corp. (32.6%), APDC (20.9%), Sumitomo Petroleum Development (20.2%), Overseas Petroleum Corp. (12.8%), International Resources (10.1%) and Japan Resources (3.4%).

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